

1 **INFLATING/DEFLATING DEVICE IN COMBINATION WITH AN**
2 **INFLATABLE MATTRESS HAVING MULTIPLE CHAMBERS**

3 **BACKGROUND OF THE INVENTION**

4 **1. Field of the Invention**

5 The present invention relates to an inflating/deflating device and more
6 particularly to the inflating/deflating device in combination with an inflatable
7 mattress having multiple chambers such that the inflating/deflating device is able
8 to inflate or deflate multiple chambers simultaneously.

9 **2. Description of Related Art**

10 It is to be noted that an inflatable mattress has only one chamber defined
11 inside the inflatable mattress such that when a pump is connected to the nozzle
12 on the inflatable mattress, the pump is able to quickly inflate (or deflate) the
13 mattress. However, when the inflatable mattress has more than one chamber
14 defined therein, the user will have to move the pump around to inflate another
15 chamber after the first chamber has been inflated. That is, the user has to
16 individually inflate each and every chamber in the mattress so that the user is
17 able to comfortably lie on the mattress. However, because the user has to move
18 the pump around the mattress to inflate each and every one of the chambers in
19 the mattress, time and effort are wasted in moving, hooking and unhooking the
20 pump to the mattress, etc.

21 To overcome the shortcomings, the present invention tends to provide an
22 improved inflating/deflating device in combination with an inflatable mattress
23 having multiple chambers to mitigate the aforementioned problems.

1 SUMMARY OF THE INVENTION

2 The primary objective of the present invention is to provide an improved
3 inflating/deflating device having an inlet, multiple outlets defined in a casing of
4 the inflating/deflating device, an air pump received in a room in communication
5 with the inlet and multiple electromagnetic valves respectively received in a
6 corresponding one of the outlets, such that after the electromagnetic valves are
7 opened, activation of the air pump is able to conduct inflation/deflation to the
8 chambers simultaneously.

9 Another objective of the present invention is to provide a linkage in
10 connection with each one of the electromagnetic valves such that each
11 electromagnetic valve is able to be activated or deactivated simultaneously with
12 the other valve.

13 Other objects, advantages and novel features of the invention will
14 become more apparent from the following detailed description when taken in
15 conjunction with the accompanying drawings.

16 BRIEF DESCRIPTION OF THE DRAWINGS

17 Fig. 1-1 is a perspective view of an inflatable mattress with an
18 inflating/deflating device on the side of the inflatable mattress;

19 Fig. 1-2 is a schematic view showing the inflating/deflating device has
20 pipes in connection and communication with different chambers of the inflatable
21 mattress;

22 Fig. 2 is a schematic view showing the internal structure of a second
23 embodiment of the inflating/deflating device of the present invention;

24 Fig. 3 is a side view of another embodiment of the inflating/deflating

1 device of the present invention;

2 Fig. 4 is a cross sectional view of the inflating/deflating device in Fig. 3;

3 Figs. 5 and 6 are cross sectional views of the third embodiment of the
4 present invention;

5 Figs. 7 and 8 are cross sectional views of the fourth embodiment of the
6 present invention;

7 Fig. 9 is a circuit diagram applied to the embodiment in Fig. 7, wherein
8 the power to the circuit diagram is alternating current;

9 Fig. 10 is a circuit diagram applied to the embodiment in Fig. 7, wherein
10 the power to the circuit diagram is direct current;

11 Fig. 11 is a schematic view showing the inflating/deflating device used
12 to inflate/deflate the inflatable mattress having three chambers;

13 Fig. 12 is a circuit diagram applied to the embodiment in Fig. 11,
14 wherein the power is direct current;

15 Fig. 13 is a circuit diagram applied to the embodiment in Fig. 11,
16 wherein the power is alternating current;

17 Fig. 14 is a schematic view showing the inflating/deflating device
18 applied to the inflatable mattress having two chambers;

19 Fig. 15 is a circuit diagram applied to the embodiment in Fig. 14,
20 wherein the power is direct current;

21 Fig. 16 is a circuit diagram applied to the embodiment in Fig. 14,
22 wherein the power is alternating current;

23 Fig. 17 is a schematic view showing the inflating/deflating device
24 provided with cable control mechanism; and

Fig. 18 is a schematic view showing the inflating/deflating device provided with a radio control mechanism.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to Figs. 1-1 and 1-2, it is noted that the inflatable mattress (1) has a main body (11) with a first chamber (12) defined in a front portion of the main body (11) and a second chamber (13) defined in a rear portion of the main body (11). An inflating/deflating device (2) is provided on a side of the main body (11) of the inflatable mattress (1) and has pipes (not numbered) in communication with the first chamber (12) and the second chamber (13) respectively.

With reference to Fig. 2, the inflating/deflating device (2) has a casing (21) with an inlet (211) and three outlets (212,213,214) respectively defined in side walls of the casing (21). A pump (22) is mounted inside the inlet (21) so that the pump (22) is able to suck air from the surrounding environment to the inflatable mattress (1) or deflate the inflatable mattress (1) by forcing the air inside the inflatable mattress (1) out of the inflatable mattress (1) from the inlet (211). Each of the outlets (212,213,214) has a controllable valve (23,24,25) to control opening of the outlets (212,213,214).

The valves (212,213,214) in Fig. 2 are controlled by electromagnetic switches (23A,24A,25A) so that after the coils (23A1,24A1,25A1) respectively mounted on the electromagnetic switches (23A,24A,25A) are energized, under the influence of magnetic field, the valves (23,24,25) are pushed to open and recoil springs (23A2,24A2,25A2) respectively mounted on the electromagnetic switches (23A,24A,25A) are compressed. Thus the outlets (212,213,214) are

1 open. The operator is able to use the pump (22) to deflate or inflate different
2 portions of the inflatable mattress (1) simultaneously. After the power to the
3 coils (23A1,24A1,25A1) is terminated, under the influence of recoil force from
4 the springs (23A2,24A2,25A2), the valves (23,24,25) are pushed back to close
5 the outlets (212,213,214).

6 With reference to Figs. 3 and 4, rotation of the knobs (23B,24B,25B) in a
7 first direction is able to force the valves (23,24,25) to open the outlets
8 (212,213,214) and compress springs (23B2,24B2,25B2) respectively mounted
9 on the valves (23,24,25). With the activation of the pump (22) inside the inlet
10 (211), the operator is able to inflate or deflate different portions of the inflatable
11 mattress simultaneously. When the knobs (23B,24B,25B) are rotated in a second
12 direction, the springs (23B2,24B2,25B2) are released to push the valves
13 (23,24,25) back to close the outlets (212,213,214). Further a linkage (26) is
14 provided to connect to each of the knobs (23B,24B,25B) and has three sets of
15 ears (23B3,24B3,25B3) respectively formed on both sides of the knobs
16 (23B,24B,25B) to ensure that the knobs (23B,24B,25B) can only be rotated
17 simultaneously or individually in the same direction. Therefore, the operator is
18 able to control the inflating portion inside the inflatable mattress to have
19 different portions of the operator's body to be supported simultaneously or
20 individually. For example, the operator is able to inflate the first chamber (12) of
21 the inflatable mattress (1) to have full support to the operator's upper body or the
22 operator is able to inflate the second chamber (13) to have full support to the
23 operator's legs, as shown in Figs. 1-1 and 1-2.

24 With reference to Fig. 5, the controlling mechanism may adopt the

1 pushbuttons (23C,24C,25C). The pushbuttons (23C,24C,25C) are pushed to
2 open the valves (23,24,25) and controlled by a linkage (28). In the meantime,
3 springs (23C2,24C2,25C2) are compressed and outlets (212,213,214) are open.
4 Therefore, the operator is able to use the pump (22) to inflate or deflate different
5 portions of the inflatable mattress. When a master pushbutton (27) is pressed, the
6 pushbuttons (23C,24C,25C) are released from the linkage (28). Under the
7 influence of the springs (23C2,24C2,25C2), the valves (23,24,25) close the
8 outlets (212,213,214). Thereafter, the master pushbutton (27) and the linkage (28)
9 return to their original positions under the influence of springs (271,281). As
10 shown in Fig. 6, it is noted that the pushbuttons (23C,24C,25C) are respectively
11 provided with contact switches (23C3,24C3,25C3).

12 With reference to Figs. 8 to 10, it is noted that the controlling mechanism
13 of the valves (23,24,25) may also control the rotation direction of the pump (22).
14 A stop switch is the same as that of the master switch to release limitations to the
15 other switches such that detailed description is omitted.

16 With reference to Figs. 11 to 17, it is noted that a wire controlling circuit
17 in different embodiments is shown.

18 Figure 18 shows a wireless controlling circuit to be used in the
19 controlling mechanism of the present invention. However, because the
20 knowledge of wireless control is conventional, detailed description is omitted.

21 It is to be understood, however, that even though numerous
22 characteristics and advantages of the present invention have been set forth in the
23 foregoing description, together with details of the structure and function of the
24 invention, the disclosure is illustrative only, and changes may be made in detail,

- 1 especially in matters of shape, size, and arrangement of parts within the
- 2 principles of the invention to the full extent indicated by the broad general
- 3 meaning of the terms in which the appended claims are expressed.